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## Powering our Parks with Energy from the Sun

By Marilyn Arnold and Arlene Thompson, National Renewable Energy Laboratory

One excellent way to help preserve our fragile wilderness areas, and make visits more pleasurable, is to use quiet, nonpolluting sources of heat and electricity in the nation's parks and recreation areas. For more than a decade, the U.S. Department of Energy (DOE) and the Department of Interior's (DOI's) National Park Service (NPS) have been working together to do just that.

Recently, many joint projects have been carried out through DOE's Federal Energy Management Program (FEMP). In April 1999, a new joint partnership created by DOE and NPS, "Green Energy Parks: Making the National Parks a Showcase for a Sustainable Energy Future," was announced at a ceremony at the Presidio of San Francisco. At this event, DOE Secretary of Energy Bill Richardson and DOI Assistant Secretary Donald Barry, standing in for Secretary Bruce Babbitt, signed a Memorandum of Understanding between the two agencies that will further encourage the use of solar and other renewable technologies throughout the park system. The Green Energy Parks Program has two primary goals:

- To implement an array of energy and renewables projects in the national parks
- To educate the visiting public about the impacts of energy use and the role that technologies can play to lessen these effects.

This program will help to meet the objectives of the National Energy Policy Act of 1992 and subsequent Executive Orders, such as E.O. 13123, as well as other national and

local regulations calling for greater energy efficiency and better air quality in the national parks. DOE FEMP, with support from the National Renewable Energy Laboratory (NREL), has taken the lead in planning and developing the program, but most of the offices within DOE's Office of Energy Efficiency and Renewable Energy will also be involved.

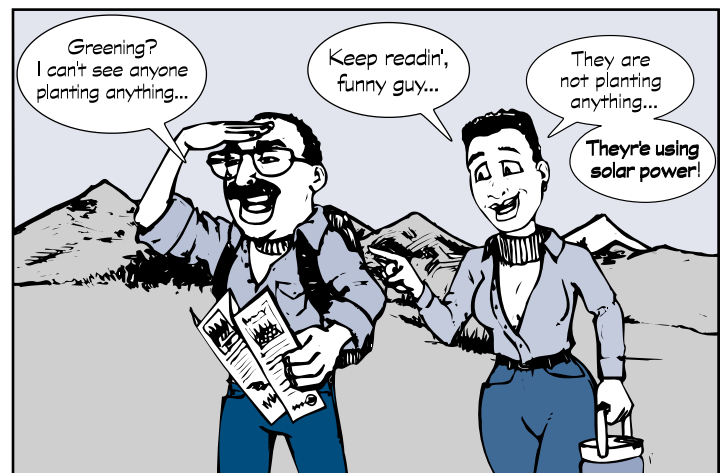
These interagency collaborations have been strongly supported by staff in several of DOE's national laboratories, and as a result, hundreds of both small and large solar energy systems have been installed in our parks. Staff in such laboratories as Sandia National Laboratories (SNL) in New Mexico, Lawrence Berkeley National Laboratory in California, and NREL in Colorado have been providing extensive technical assistance and project guidance for a number of years. Sandia's Renew the Parks Program, funded by DOE's Office of Power Technologies, has been particularly successful in implementing many solar projects in the national parks.

The goal of the new program is to install as many cost-effective, reliable, renewable

(Continued on p. 4)



U.S. Department of Energy  
Federal Energy Management Program



# The Sustainable Buildings Industry Council Creates a Blueprint for Change

By Devin Schroeder, National Renewable Energy Laboratory

Imagine you are planning to design and build a new office complex for a Federal agency or a new elementary school on Native American land. You must make these buildings look as modern and inviting as possible while keeping your costs down. Because new Federal construction must meet certain goals for energy efficiency, the challenge is to integrate energy-reduction and cost-savings measures into the building design.

At first, your dream of a low-cost yet attractive and comfortable building might seem to be disappearing. But take heart; according to the staff of the Sustainable Buildings Industry Council (SBIC) and other experts, your building can be low-cost, energy-efficient, and more attractive and inviting than ever before—all at once.

For centuries, we have seen buildings get bigger and bigger, and consume more and more energy, so that, supposedly, the quality of our lives can improve. We have been willing to spend millions of dollars in building and energy costs to create comfortable surroundings. But the cost to our health and the environment has also been high. To address this problem, the SBIC (formerly the Passive Solar Industries Council) has been changing conventional thinking when it comes to designing buildings for more than 20 years.

The council knows that there are many ways to save money and energy by carefully planning the essential elements of a building. For example, floors and walls can be designed to collect and store solar energy for extra heating and natural cooling. Energy-efficient windows can be placed to bring more sunlight into the interior, reducing the cost of lighting the building. Simple solar systems, such as solar water-heating units, can be installed at minimal cost, and this money can be recouped through energy cost savings in the first few years of use.

The SBIC advocates the integrated use of as many energy-efficient techniques and materials as possible. Using sustainable options also reduces maintenance costs as well as adverse impacts on the environment.



*The SBIC trains others in designing energy-efficient buildings like the District Attorney Building in Jefferson County, Colorado, a high-quality, 52,000-square-foot structure housing more than 130 judicial employees; this two-story building was built with recycled materials.*

Research has shown that these practices also increase employees' and students' productivity, sense of well-being, and reported comfort levels.

The council is a nonprofit organization whose mission is to "advance the design, affordability, energy performance, and environmental soundness of residential, institutional and commercial buildings." The group is accomplishing this by conducting professional training courses and workshops, educating designers and consumers, and promoting the use of a range of energy analysis tools. The council also provides information on conservation measures, energy-efficient equipment and appliances, sustainable architecture, and software.

The SBIC also stresses how important it is for people to *not* just focus on installing a single new renewable energy system. That one system won't make a significant difference if the building is poorly insulated or doesn't make good use of natural cooling and heating. A sustainable building requires the integrated use of daylighting, thermal mass, an efficient envelope (outer structure), efficient glazing, and materials that are appropriate for a given climate.

The SBIC specializes in teaching people how to locate, design, and construct sustainable buildings. For example, the council holds workshops that provide opportunities for attendees to learn and utilize software such as Energy-10, which was developed at the National Renewable Energy Laboratory

to help design low-energy buildings. More than 1100 users and 40 schools of architecture are now licensed to use Energy-10.

Will Zachmann, Director of Communications for the SBIC, said, "Our biggest challenge has been — and continues to be — overcoming resistance to change." Despite the great technological strides that have been made in recent decades, the building industry has not experienced a significant change in many years. However, a greater interest in energy efficiency and concern for the environment are knocking at the door of today's industry.

President Clinton's Million Solar Roofs initiative has also brought attention to the importance of energy conservation and environmental remediation through the use of renewable energy. This renewed interest is bringing new attention to SBIC's work and its many partnerships, such as with the Department of Energy's Building America, Rebuild America, and Federal Energy Management Programs.

For further information, please see SBIC's Web site at [www.SBICouncil.org](http://www.SBICouncil.org). ■

Dave Parsons, NREL/PIX04219

# FEMP Partnerships Bring Renewables to Federal Facilities Serving Native Americans

By Patrina Eiffert, Ph.D., National Renewable Energy Laboratory

With the assistance of the Department of Energy's Federal Energy Management Program (FEMP), many new renewable energy technologies — solar water heaters, solar-powered lights, rooftop photovoltaic systems, and more — are being installed at Federal facilities that serve Native Americans. These projects were designed mainly to save energy and money. But they are also providing economic opportunities for the Native Americans who assist in producing, installing, operating, and maintaining the renewable energy technologies and systems installed in each project.

In fiscal years 1998 and 1999, FEMP provided funding and technical assistance for seven projects carried out in partnership with the Indian Health Service in the U.S. Department of Health and Human Services, the Bureau of Indian Affairs in the U.S. Department of the Interior, and other project partners. The missions of most Federal agencies include providing support and services to Native Americans, so they were eligible to apply for funding.

To qualify for funding and support, applicants needed to assure FEMP reviewers that their proposed projects pertained to Federal facilities serving a Native American population. In addition, the projects had to be cost-effective; in other words, any new

equipment installed had to have less than a 25-year payback period after all applicable state and utility incentives (e.g., rebates and tax credits) and any non-Federal cost-sharing amounts were subtracted.

The projects were also designed to support sustainable economic development in Native American communities. Applicants were thus asked to form appropriate collaborations with others whenever possible; cost-sharing and leveraging of funds were encouraged. The applicants were also asked to identify likely benefits (such as new jobs) to the associated population. And they needed to include any plans they had for implementing education and training programs for tribal members.

FEMP encouraged agencies to purchase standardized (virtually "off-the-shelf") energy systems, in part because it fosters the inclusion of renewable energy equipment on GSA Federal supply schedules, making the equipment more accessible to government procurement staff (for the Solar Supply Schedule, please see <http://www.gsa.gov/regions/7fss/7fx/schedules/sch62ii.html>). Standardizing the systems also helps to reduce the cost of renewable energy through higher volume manufacturing and purchases. In addition, agencies were encouraged to use renewable energy technologies in concert with proven energy conservation measures.

Applicants were also asked to show how the project could be replicated or serve as a pilot demonstration for a larger project. They also needed to state the ways in which a project might be a showcase that would help educate the government and the public about the benefits of using renewable energy.

After a number of proposals were evaluated on the basis of these criteria and guidelines, seven projects were funded by FEMP in FY 1998 and 1999. Three of them were funded for Indian Health Service facilities in the Department of Health and Human Services:

*With funding from FEMP, three much-needed photovoltaic energy systems are being installed on the Havasupai Indian Reservation in Supai, Arizona. They should supply up to 2 kilowatts of electric power to a school, a jailhouse, and a government fourplex, which includes housing for local teachers and police officers.*

- **Albuquerque, New Mexico** — \$13,000 was awarded to provide solar-powered street lights for the New Sunrise Regional Treatment Center; the estimated simple payback period is 4.8 years.
- **Anchorage, Alaska** — \$45,000 went to the Indian Health Service and the Alaska Native Medical Center, Anchorage, for a groundwater cooling system. The estimated simple payback period is 5.1 years.
- **Santa Fe, New Mexico** — \$60,000 was awarded for a two-phase project to refurbish a large solar water heater for an Indian Health Service hospital. The estimated simple payback period is 6 years.

Four projects were funded for the Department of the Interior, Bureau of Indian Affairs:

- **Fort Apache Indian Reservation, Arizona** — \$23,500 went to the Bureau of Indian Affairs and the Fort Apache Agency to install five new wind turbines in Arizona. The estimated simple payback period is 13.83 years.
- **Riverside, California** — \$50,000 was awarded to the Bureau of Indian Affairs and the Sherman Indian School to install a 30-kilowatt photovoltaic system. The estimated simple payback period is 13 years.
- **Seba Dalkai, Arizona** — \$50,000 was awarded to the Bureau of Indian Affairs and Seba Dalkai School for a photovoltaic system for a school to be completed in 2001. The estimated simple payback period is 14.26 years.
- **Supai, Arizona** — \$61,300 went to the Bureau of Indian Affairs and the Truxton Canon Agency to install three photovoltaic systems at facilities on the Havasupai Indian Reservation. The estimated simple payback period is 16.4 years.

Projects like these not only foster greater energy efficiency in government facilities, they are also good for the environment. The agencies involved are all helping to reduce the greenhouse gas emissions associated with burning fossil fuels to generate heat and electric power. For more information, contact Patrina Eiffert, NREL, 303-384-7548. ■



NREL/PX07170



## Powering our Parks

(Continued from p. 1)

energy systems in the parks as possible, using innovative but well-tested technologies. In many cases, renewable energy systems are the best choice in remote areas. They can provide electric power where it has never been available, and they reduce the noise, air pollution, and potential fuel-spill problems associated with diesel generators.

Large solar electric (photovoltaic or PV) systems, called *arrays*, are now providing electricity for lights, battery charging, and other uses in places like Glen Canyon National Recreation Area in Utah. Meanwhile, smaller solar systems have been used extensively for many years, especially in remote sites, to heat water or to provide power for radio communications and other needs. These systems help to ensure the safety of park visitors and staff during emergencies such as fires or floods. And PV/propane generators are becoming increasingly popular replacements for diesel-powered gensets. As other national parks explore the use of environmentally benign renewable energy systems, the number of projects should increase significantly over the next decade.

Two hundred and seventy million people visit our national parks each year. If even a portion of these visitors come away with a greater understanding of the potential role of renewable energy systems in supplying clean power for homes, businesses, and communities, these projects will have been more than successful.

The list of national parks and recreation areas that are now home to renewable energy systems is extensive (see, for example, [www.eren.doe.gov/femp/techassist/greenparks.html](http://www.eren.doe.gov/femp/techassist/greenparks.html), [www.sandia.gov/pv/rnwprks.pdf](http://www.sandia.gov/pv/rnwprks.pdf), [www.nps.gov/renew](http://www.nps.gov/renew)). Some recent examples of collaborative DOE/NPS solar energy projects can be found at Joshua Tree National Park and Mojave National Preserve in California, and at Sleeping Bear Dunes National Lakeshore in Michigan's Lower Peninsula. Brief descriptions follow.

### **Joshua Tree National Park and Mojave National Preserve**

Joshua Tree National Park comprises 794,000 acres in the area between the Mojave and Colorado Deserts in Southern California. Proclaimed a national monument in 1936, Joshua Tree was designated a national park in 1994. The eastern part of the park features abundant natural gardens of creosote bush, ocotillo, and cholla cactus. Forests of Joshua trees, which usually require a little more moisture and cooler air, make up the western part. Five fan-palm oases mark the areas where water occurs naturally and desert wildlife abounds.

Mojave National Preserve was created in October 1994 with the passage of the California Desert Protection Act, and it is one of the most diverse desert environments in the world. The area features low flats dominated by creosote bushes as well as higher elevations marked by pinyon pine and juniper woodlands. In more than 1.6 million acres of desert, one finds sand dunes, volcanic cinder cones, Joshua tree

forests, vast vistas, and high mountains, among other natural wonders.

These unique areas will now have cleaner air, as well, since many of the diesel generators used in park operations are being replaced with PV systems to produce electricity. This is significant, because these areas have suffered the worst air pollution of any of the 378 national parks. Reducing this pollution has long been a priority of several national and local government and environmental groups.

A contract awarded through Edison Company, the local utility, recently resulted in the installation of a 21-kilowatt, off-grid hybrid PV/propane system at Cottonwood Campground in the park. The system eliminates the need for 16,000 gallons of diesel fuel per year, and will reduce generator noise in the area as well as the risk of a costly fuel spill. The renewable part of the system will provide 76% of the area's electrical requirements. The project was a combined effort of NPS, Southern California Edison Company's Utility Power Group, SNL, FEMP, and NREL.

Southern California Edison offered utility services to help leverage funds and implement the project through its Experimental Schedule PVS Tariff, California Public Utilities Commission Resolution E-3367. The tariff allows the utility to install PV systems, controls, batteries, mounting hardware, and other necessary equipment for a fixed monthly service charge equal to 1.6% of the PV system's installed cost for a term of 15 years (this works out to an annual payment of 19.15%). The utility also assumes the responsibility for operation and maintenance of the power generation system. In September 1997, contracts were signed to provide nonpolluting solar-generated electricity at both Joshua Tree National Park and Mojave National Preserve. And in October 1998, the first system became operational; it is now the prime power source for the Cottonwood complex. For more information, please contact Andy Walker, NREL, 303-384-7531 (e-mail: [andy\\_walker@nrel.gov](mailto:andy_walker@nrel.gov)).

### **Sleeping Bear Dunes National Lakeshore**

Sleeping Bear Dunes National Lakeshore in Michigan's Lower Peninsula is a picturesque 35-mile stretch of Lake Michigan's eastern coastline; the park also includes North and South Manitou Islands. This park



*A cost-effective PV array has replaced a diesel system at Joshua Tree National Park's Cottonwood Campground in the California desert.*

Harry Carpenter/PIX07260



Curran Corporation/PIX05667

*This 11.2-kilowatt photovoltaic array is part of a hybrid solar/diesel generator power system on North Manitou Island, Sleeping Bear Dunes National Lakeshore, Michigan. Three identical subarrays, each with eight strings of nine Siemens Solar M55 PV modules, provide a total peak current of 75 amperes for charging a 288-kilowatt, 120-volt battery bank.*

contains forests as well as beaches and dunes, among other natural features. The Lakeshore is also home to such historic landmarks as a lighthouse dating from 1871 and an extensive rural historic farm district.

As part of a hybrid energy system made up of both renewable and conventional sources of energy, an 11.2-kilowatt PV system was installed on North Manitou Island to reduce the use of conventional generators while meeting the area's electrical needs around the clock. The generators are now operated only when needed during daytime working hours; they are turned off in the evening. This change greatly reduces the negative impacts of generator noise on both employees and visitors.

Solar-powered fans provide ventilation for vault toilets throughout the Lakeshore.

And solar water-heating systems have been operating successfully there for the past seven years, demonstrating that solar energy can be used all over the nation, not just in the Southwest! The pressurized, chlorinated water-heating systems support campgrounds and picnic areas on the mainland and the islands. The park is also planning to install a PV system on South Manitou Island as part of a cost-shared project with SNL.

Staff in DOE, its national laboratories, DOI, and the NPS are all enthusiastic about working together, and with other agencies in the future, as part of this exciting new program. For more information, please contact Marilyn Arnold, NREL, 202-651-7533 (e-mail: [marilyn\\_arnold@nrel.gov](mailto:marilyn_arnold@nrel.gov)). ■

## Save with Solar Wins Publication Award

*Save with Solar: A Technical Bulletin for Federal Solar Energy Champions* received a 1999 Award of Merit from the Society for Technical Communication's Rocky Mountain Chapter. With more than 20,000 members worldwide, STC is the largest professional organization serving the technical communication profession.

One competition judge complimented us on our "clear and engaging style." We hope you are enjoying this publication, as well, and finding it informative and useful. As always, we welcome your suggestions for improving it. ■

### Comparison of Diesel System and Current PV System at Joshua Tree (1996 data)

System	Before PV Installation 2 diesel generators (\$32,000)	After PV Installation 21-kW PV array, 30-kW propane backup generator (\$47,875 including financing)
Fuel Costs/year	\$10,950	\$1,100
Emissions/year	5,770 lb NO <sub>x</sub> 120 tons CO <sub>2</sub> 286 lb SO <sub>2</sub> 218 lb particulates	0 lb NO <sub>x</sub> 30 tons CO <sub>2</sub> 0 lb SO <sub>2</sub> 0 lb particulates
Total Operating Costs/year	\$49,770	\$4,065
Simple Payback		5.6 years

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# YOU HAVE the POWER.



**A Federal Energy Management Program initiative, You Have the Power is designed to raise awareness of energy efficiency in the Federal sector. Find out more about it at <http://www.eren.doe.gov/femp>**

# Western Area Power Administration Is Going Green

Western Area Power Administration's Rocky Mountain Customer Service Center (RMR) recently installed a 4-kilowatt photovoltaic (PV) array at an RMR building east of Loveland, Colorado; the system is now the largest PV installation in Larimer County. Western also held a hands-on workshop for 35 local electric utility staff, students, and Federal agency personnel on how to install the system. In addition to gaining direct experience, workshop attendees learned about the technical and market aspects of adding solar to buildings and to the utility grid.

RMR's new system is composed of 96 Solarex Millennia thin-film amorphous silicon modules with an Omnion inverter to convert direct-current solar power into alternating current. The electricity is then fed into the building to offset energy purchased from the utility. The system can generate more than 8000 kilowatt-hours of clean energy every year. RMR chose Altair Energy of Golden, Colorado, to install the system and Energy Solutions of Gold River, California, to conduct the workshop. The thin-film PV system was funded through a cost-shared grant from DOE FEMP. Three more systems will be installed at Western's facilities in Salt Lake City, Utah, Phoenix, Arizona, and Folsom, California, for an additional 12 kilowatts of green power. All systems will be listed on the registry of the Million Solar Roofs Initiative. ■



Peggy Place, WAPA/PIX08822



Peggy Place, WAPA/PIX08824

*"Never be afraid to try something new. Remember, amateurs built the ark; professionals built the Titanic."*

— Anonymous

## Treasure Chest: Events, Publications, Web Sites, and Other Gems

### Events

#### **Designing and Installing Code-Compliant PV Systems:**

This three-day workshop includes hands-on training and provides contractors with basic requirements for properly installing PV systems as part of the Million Solar Roofs initiative and the California Buydown program. Sponsored by PVUSA, which presents a certificate to attendees after the successful completion of all three days.

Dates: April 12–14, 2000  
Location: Davis, California  
Contact: Bill Brooks, 530-753-0725  
<http://www.pvusa.com>

#### **National Center for Photovoltaics Program Review**

**Meeting 2000:** This meeting will review recent developments in photovoltaic technology, from the laboratory to the marketplace. It will focus on highlights from the U.S. Department of Energy PV program at the National Renewable

Energy Laboratory and Sandia National Laboratories. Sponsors include DOE, NREL, and SNL.

Dates: April 16–19, 2000  
Location: Denver, Colorado  
Contact: Camilla Course, 303-275-4321  
[http://www.nrel.gov/ncpv\\_prm](http://www.nrel.gov/ncpv_prm)

**Solarex 2000:** The largest solar gathering in the world will feature a Solar Exhibition Tent on the Mall, as part of the 30th anniversary of Earth Day, and the Million Solar Roofs Initiative Quarterly Meeting on April 19. Sponsors include the Solar Energy Industries Association and DOE.

Dates: April 19–22, 2000  
Location: Loy Auditorium, U.S. Department of State  
Contact: Michelle Crespo, 301-941-2553  
<http://www.seia.org>

**Earth Day 2000 — New Energy for a New Era:** The Earth Day Network is launching "a global campaign to bring about a swift transition to clean, renewable energy sources and a giant leap forward in energy efficiency." The Earth Day 2000 Clean Energy Agenda has a goal to provide at least 12% of U.S. energy needs from renewable energy sources by 2010 and 25% by 2020.

Activities will be held all over the nation. Sponsors include DOE, EPA, state organizations, environmental groups, and many others.

Date: April 22, 2000  
Location: All Across the United States  
Contact: Earth Day Network, 206-264-0114  
<http://www.earthday.net>;  
[www.earthday.net/energy/agenda3.html](http://www.earthday.net/energy/agenda3.html)

#### **11th Annual Global Warming International Conference**

**& Expo:** Some of the topics to be covered are Global Warming and Climate Change, Greenhouse Gas Production and Utilization, Industrial Technology and Greenhouse Gas



Emissions, Carbon Emissions, Energy Use and Cost, State and Local Government Actions, and many more. Sponsored by the Global Warming International Center.

Dates: April 25–28, 2000

Location: Boston, Massachusetts

Contact: Global Warming International-USA, 630-910-1551

<http://GlobalWarming.net>

**Windpower 2000:** One of the most important annual conferences in the United States on the progress and potential of wind energy, the fastest growing energy technology in the world. Sponsored by the American Wind Energy Association and several other organizations.

Dates: April 30–May 4, 2000

Location: Palm Springs, California

Contact: AWEA, 202-383-2500

<http://www.awea.org>

#### **Course on Renewable Energy Technologies and Projects:**

This two-day course provides engineers, architects, energy specialists, Federal facility managers, and project leaders with information about renewable energy technologies and tips on how to implement projects to meet the goals of E.O. 13123. Sponsored by DOE, FEMP, and NREL.

Dates: May 1–2, 2000

Location: Golden, Colorado

Contact: Gail Norby, 303-384-7407

E-mail: [Gail\\_Norby@nrel.gov](mailto:Gail_Norby@nrel.gov)

**Photovoltaic Design & Installation:** Participants learn how to design, install, and use photovoltaic technology to produce electricity from the sun. They learn system sizing, site analysis, hardware specification, and component selection. This workshop is for the beginner and those seeking employment in the solar industry. Given by members of Solar Energy International.

Dates: May 1–12, 2000

Location: Carbondale, Colorado

Contact: Solar Energy International, 970-963-8855

<http://www.solarenergy.org>

**Life-Cycle Costing:** DOE's Federal Energy Management Program is presenting workshops to help implement Executive Order 13123. They are open to engineers, architects, energy analysts, Federal energy coordinators, and managers of Federal, state, and local government facilities as well as those in the private sector. The basic two-day workshop provides a framework for evaluating and comparing the economic performance of alternative energy conservation strategies.

Dates: May 15–16, 2000

Location: Denver, Colorado

Contact: Amy Tilton, P.O. Box 999 (K8-62), Richland, WA 99352

<http://www.pnl.gov/femp>

**11th Annual Midwest Renewable Energy Fair:** The fair will be held at the Dane County Exposition Center in conjunction with the American Solar Energy Society's Solar 2000 conference (see below). Sponsored by the Midwest Renewable Energy Association.

Dates: June 16–18, 2000

Location: Madison, Wisconsin

Contact: MREA, 715-592-6595

<http://www.the-mrea.org>

#### **Solar 2000 (Solar Powers Life — Share the Energy):**

Solar 2000 will explore the many ways solar powers life. This meeting is held in conjunction with the Midwest Renewable Energy Association's Midwest Renewable Energy Fair. A Million Solar Roofs Initiative Quarterly Meeting will also be held here on June 21. Sponsored by the American Solar Energy Society (ASES) and others.

Dates: June 19–21, 2000

Location: Madison, Wisconsin

Contact: ASES, 303-443-3130

<http://www.ases.org/conference/solar2000.htm>

### **Publications**

The following publications can be obtained on the Web at <http://www.repp.org> or by contacting Mary Kathryn Campbell at the Renewable Energy Policy Project, Center for Renewable Energy and Sustainable Technology (REPP-CREST), 202-293-2898.

**Financing Solar Energy in the U.S.,** by Michael T. Eckhart: This paper creates a framework for a future project on the "finance ability" of solar energy. It considers solar energy from the point of view of potential lenders, who assess the likelihood of repayment on the basis of three factors. Policies and programs must address these factors to have an impact on market-based lending decisions. This paper proposes a project to develop such policies.

**The Grassroots Are Greener: A Community-Based Approach to Marketing Green Power,** by Rudd Mayer, Eric Blank, and Blair Swezey; Research Report No.8, June 1999: One of the most successful U.S. green pricing programs emerged from an innovative partnership between the Land and Water Fund of the Rockies and Public Service Company of Colorado. An approach in which the environmental group helps to market the utility's green power entails risks but has potential benefits, and may be a model for other organizations and states.

**Power Switch: Will the Restructured Electricity Utility Help the Environment?** by Richard Hirsh and Adam Serchuk; reprinted from *Environment* magazine, September 1999: Some worry that less regulatory oversight will harm the environment and create a market dominated by cheap, polluting sources of electric power. Others hope that new technologies will be cleaner and cheaper, and people will voluntarily buy "green" power from renewable resources. Which vision is right?

**Renewable Energy Policy Outside the United States,** by Curtis Moore and Jack Ihle; Issue Brief No.14, October 1999: Many developed nations have enacted policies to commercialize renewable energy. Our nation can learn from all of them in order to expand the domestic renewable energy market. But unless a multiyear plan for commercialization is created soon, our share of the global market will continue to shrink.

**Rural Electrification with Solar Energy as a Climate Protection Strategy,** by Steven Kaufman with Richard Duke, Richard Hansen, John Rogers, Richard Schwartz, and Mark Trexler: As we try to control energy-related greenhouse gases, rural families in the developing world struggle to build decent lives. Photovoltaic systems can bring power to those who need it most while making a contribution to climate protection.

### **Web Sites**

For up-to-date information about other new publications, conferences, special events, and funding assistance and opportunities, please see the following Web sites:

The American Wind Energy Association  
<http://www.awea.org/>

Center of Excellence for Sustainable Development  
<http://www.sustainable.doe.gov/>

Department of Energy's Federal Energy Management Program  
<http://www.eren.doe.gov/femp/>

Million Solar Roofs Initiative  
<http://www.MillionSolarRoofs.org>

National Renewable Energy Laboratory  
<http://www.nrel.gov/>

Sandia National Laboratories  
<http://www.sandia.gov/>

Renewable Energy Policy Project  
<http://www.repp.org/>

Solar Energy Industries Association  
<http://www.seia.org/>

The Sustainable Buildings Industry Council  
<http://www.sbicouncil.org/>

Utility PhotoVoltaic Group  
<http://www.upvg.org/upvg/index.html>

# Save with Solar

## **Save with Solar: A Technical Bulletin for Federal Solar Energy Champions**

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## **For More Information**

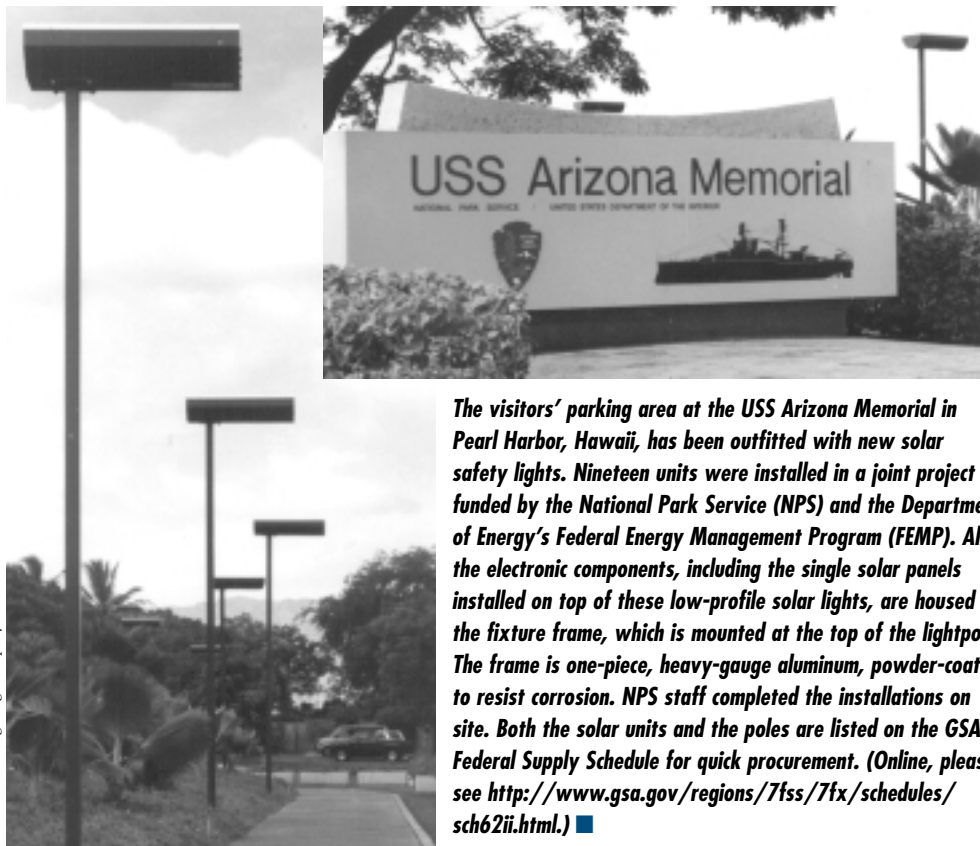
FEMP Help Desk:  
1-800-363-3732

Anne Sprunt Crawley  
Technical Assistance Program Manager  
Federal Energy Management Program  
U.S. Department of Energy  
1000 Independence Ave., S.W.  
Washington, DC 20585  
202-586-1505



**Federal Energy Management Program**

Solar Outdoor Lighting Company/ PIX08821



Solar Outdoor Lighting Company/ PIX08819

*The visitors' parking area at the USS Arizona Memorial in Pearl Harbor, Hawaii, has been outfitted with new solar safety lights. Nineteen units were installed in a joint project funded by the National Park Service (NPS) and the Department of Energy's Federal Energy Management Program (FEMP). All the electronic components, including the single solar panels installed on top of these low-profile solar lights, are housed in the fixture frame, which is mounted at the top of the lightpole. The frame is one-piece, heavy-gauge aluminum, powder-coated to resist corrosion. NPS staff completed the installations on site. Both the solar units and the poles are listed on the GSA Federal Supply Schedule for quick procurement. (Online, please see <http://www.gsa.gov/regions/7fss/7fx/schedules/sch62ii.html>.) ■*